

30-015-32247

NM OIL CONSERVATION
ARTESIA DISTRICT

AUG 06 2014

RECEIVED

COG OPERATING

Empire, Yeso East

Eddy County, NM

White Star Federal #20

VH - Job #32K12121540

Survey: Gyro

SDI Standard Survey Report

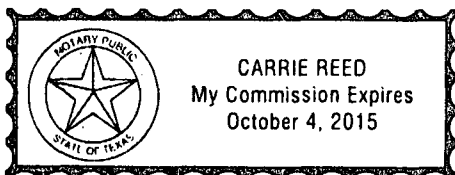
This survey is correct to the best of my knowledge and is supported by actual field data.

Shaw

Notarized this date 8th of January, 2013.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well White Star Federal #20
Project:	Empire, Yeso East	TVD Reference:	WELL @ 0.00usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	White Star Federal #20	North Reference:	Grid
Wellbore:	VH - Job #32K12121540	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K12121540	Database:	EDM-Regulatory

Project	Empire, Yeso East		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Eddy County, NM		
Site Position:		Northing:	667,566.74 usft
From:	Lat/Long	Easting:	572,079.69 usft
Position Uncertainty:	0.00 usft	Slot Radius:	0"
		Latitude:	32° 50' 6.025 N
		Longitude:	104° 5' 55.187 W
		Grid Convergence:	0.13 °

Well	White Star Federal #20, Vertical		
Well Position	+N-S	0.00 usft	Northing: 658,110.56 usft
	+E-W	0.00 usft	Easting: 574,455.10 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 48' 32.400 N
		Longitude:	104° 5' 27.600 W
		Ground Level:	0.00 usft

Wellbore	VH - Job #32K12121540		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	12/20/12	(°)
			7.69
			Dip Angle (°)
			60.60
			Field Strength (nT)
			48,785

Design	VH - Job #32K12121540		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
		Direction	(°)
		295.63	

Survey Program	Date	01/08/13		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100.00	5,513.00	Gyro (VH - Job #32K12121540)	Keeper	Keeper Gyro

Survey							
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.60	139.79	100.00	-0.40	0.34	139.79	0.52
200.00	0.34	150.92	199.99	-1.06	0.82	142.24	1.34
300.00	0.79	202.87	299.99	-1.95	0.70	160.38	2.07
400.00	0.77	191.21	399.98	-3.25	0.30	174.76	3.26
500.00	0.89	189.10	499.97	-4.67	0.04	179.45	4.67
600.00	0.98	183.04	599.96	-6.29	-0.12	181.13	6.30
700.00	0.73	157.07	699.95	-7.74	0.08	179.41	7.74
800.00	0.43	170.35	799.94	-8.69	0.39	177.43	8.70
900.00	0.29	162.54	899.94	-9.30	0.53	176.74	9.32
1,000.00	0.25	139.85	999.94	-9.71	0.75	175.61	9.74
1,100.00	0.18	359.83	1,099.94	-9.72	0.89	174.79	9.76

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Wellbore:	VH - Job #32K12121540	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K12121540	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,200.00	0.06	225.99	1,199.94	-9.60	0.85	174.95	9.64	
1,300.00	0.26	359.93	1,299.94	-9.41	0.81	175.08	9.44	
1,400.00	0.52	300.71	1,399.94	-8.95	0.42	177.32	8.96	
1,500.00	0.79	308.82	1,499.93	-8.29	-0.51	183.51	8.30	
1,600.00	0.81	302.31	1,599.92	-7.48	-1.64	192.39	7.66	
1,700.00	0.63	300.32	1,699.91	-6.82	-2.71	201.70	7.34	
1,800.00	1.01	298.69	1,799.90	-6.12	-3.96	212.91	7.29	
1,900.00	0.92	294.76	1,899.89	-5.36	-5.46	225.54	7.66	
2,000.00	1.00	296.33	1,999.87	-4.64	-6.98	236.37	8.38	
2,100.00	1.18	284.96	2,099.85	-3.99	-8.75	245.51	9.62	
2,200.00	0.74	274.09	2,199.84	-3.67	-10.39	250.53	11.02	
2,300.00	0.88	288.68	2,299.83	-3.38	-11.76	253.96	12.24	
2,400.00	0.75	274.08	2,399.82	-3.09	-13.14	256.77	13.50	
2,500.00	0.82	274.35	2,499.81	-2.99	-14.51	258.36	14.81	
2,600.00	0.89	274.50	2,599.80	-2.87	-16.00	259.82	16.25	
2,700.00	0.93	279.91	2,699.79	-2.67	-17.57	261.35	17.77	
2,800.00	0.98	287.39	2,799.77	-2.28	-19.19	263.23	19.32	
2,900.00	0.96	289.87	2,899.76	-1.74	-20.79	265.22	20.86	
3,000.00	1.16	302.11	2,999.74	-0.91	-22.44	267.67	22.45	
3,100.00	1.06	299.58	3,099.72	0.08	-24.10	270.19	24.10	
3,200.00	1.01	299.65	3,199.71	0.97	-25.67	272.17	25.69	
3,300.00	0.95	304.54	3,299.69	1.88	-27.12	273.96	27.18	
3,400.00	0.81	320.37	3,399.68	2.89	-28.25	275.85	28.40	
3,500.00	0.94	310.89	3,499.67	3.97	-29.32	277.72	29.59	
3,600.00	1.10	319.08	3,599.65	5.24	-30.57	279.72	31.02	
3,700.00	0.94	320.91	3,699.64	6.60	-31.72	281.75	32.39	
3,800.00	1.26	325.67	3,799.62	8.14	-32.85	283.92	33.85	
3,900.00	1.11	320.10	3,899.60	9.79	-34.09	286.03	35.47	
4,000.00	1.11	355.26	3,999.58	11.50	-34.80	288.29	36.65	
4,100.00	0.87	354.08	4,099.56	13.22	-34.95	290.72	37.37	
4,200.00	0.70	353.54	4,199.56	14.59	-35.10	292.56	38.01	
4,300.00	0.20	191.02	4,299.55	15.02	-35.20	293.11	38.27	
4,400.00	0.12	177.57	4,399.55	14.74	-35.23	292.71	38.19	
4,500.00	0.83	275.47	4,499.55	14.71	-35.95	292.25	38.84	
4,600.00	0.81	276.18	4,599.54	14.85	-37.37	291.68	40.22	
4,700.00	1.30	279.18	4,699.52	15.11	-39.19	291.08	42.01	
4,800.00	1.14	288.00	4,799.50	15.60	-41.26	290.71	44.11	
4,900.00	1.29	306.23	4,899.48	16.57	-43.11	291.03	46.19	
5,000.00	1.20	317.77	4,999.45	18.01	-44.73	291.94	48.22	
5,100.00	1.11	307.58	5,099.43	19.38	-46.20	292.76	50.10	
5,200.00	1.27	290.43	5,199.41	20.36	-48.00	292.98	52.14	
5,300.00	1.37	321.29	5,299.39	21.68	-49.79	293.53	54.30	
5,400.00	1.09	327.77	5,399.36	23.41	-51.05	294.64	56.16	
5,500.00	0.87	326.85	5,499.35	24.85	-51.97	295.56	57.61	

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Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,513.00	0.74	308.94	5,512.35	24.99	-52.09	295.63	57.77

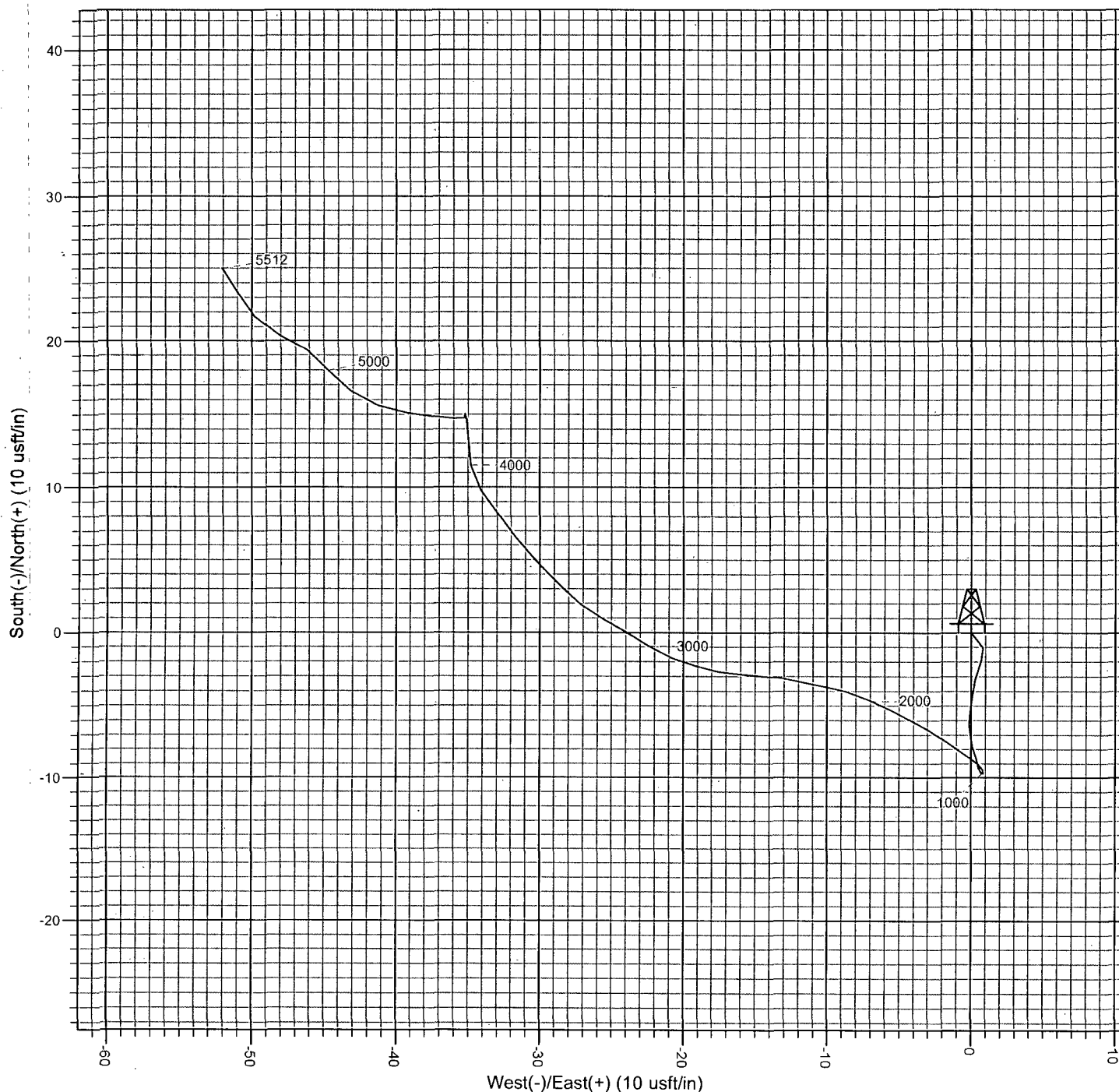


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Project: Empire, Yeso East
Eddy County, NM
Well: White Star Federal #20
Wellbore: VH - Job #32K12121540
Design: VH - Job #32K12121540

WELL DETAILS: White Star Federal #20
WELL @ 0.00usft (Original Well Elev)
Ground Level: 0.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	658110.56	574455.10	32° 48' 32.400 N	104° 5' 27.600 W	



PROJECT DETAILS: Empire, Yeso East	SITE DETAILS: Eddy County, NM
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 50' 6.025 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 104° 5' 55.187 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.00
Zone: New Mexico East 3001	Convergence: 0.13
System Datum: Mean Sea Level	Local North: Grid